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ABSTRACT

In order to promote exchanges and cooperation in technology education among all countries, country-specific information concerning technology education must be appropriately explored and reported. Through a literature review, guidelines for preparing country reports and case studies were developed. The guidelines suggest that the following elements should be included in country reports on technology education: (1) a technology education profile, including the structure of the education system, the curriculum, a description of the teaching and learning processes, and a profile of technology education teachers; (2) dynamics of the development process, including major problems; and (3) international cooperation, such as methods of cooperation and coordination, the means of information exchange, and trends in international participation. (KC)

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Running head: COUNTRY-SPECIFIC TECHNOLOGY EDUCATION

Guidelines for Reporting Country-specific Technology Education

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Abstract

In order to promote exchanges and cooperation in technology education among all countries, country-specific information concerning technology education must be appropriately explored and reported. Through literature review, this paper proposes guidelines for reporting country-specific technology education. The proposed guidelines consist of the following three parts: (1) a technology education profile, (2) the dynamics of development, and (3) international cooperation.

Guidelines for Reporting Country-specific Technology Education

We Are on the Same "Ship," So We must Learn from Each Other and Work Together

In our solar system, the earth revolves around the sun and turns by itself. Thus, someone has said that the earth is like a spaceship, and that we are on the same "ship." People on the same ship must learn from each other and work together.

In recent years, this presenter has been in charge of the following comparative and area studies on international technology education:

1. In1996, funded by the National Science Council (NSC), Taiwan, this presenter and his associates completed a study the technology education in Singapore.
2. In 1997, the International Conference on Technology Education in the Asia-Pacific Region (ICTE'97), organized by this presenter and his colleagues, was held in Taipei, Taiwan, April 23-26. International delegates came from the following eight countries in the Pacific Rim area: Australia, Hong Kong, Japan, South Korea, New Zealand, Thailand, Taiwan, and the U.S.A. They brought to the conference participants valuable country-specific information on technology education.
3. In 1997, funded by the NSC, this presenter and his colleagues completed a cross-country comparative study on technology education in the following eight countries: Australia, Japan, South Korea, Mainland China, Malaysia, New Zealand, the Philippines, and Taiwan.
4. In 1998, funded by the NSC, this presenter and his colleagues completed a cross-country comparative study on the teacher qualifications and teacher education in the field of technology education in the following five countries: Australia, Japan, Mainland China, and Taiwan.
5. Presently, funded by the NSC, this presenter and his colleagues are working on a cross-country comparative study on the instructional materials and teaching methods in technology education in the following seven countries: Australia, France, Germany, Japan, Taiwan, the U.K., and the U.S.A.

From the above investigations, this presenter has come to realize that country-specific information concerning technology education must be appropriately explored and reported so that exchanges and cooperation in technology education among all countries can be promoted. During the 1998 ITEA annual conference in Fort Worth, Texas, this presenter suggested to Dr. Kendall Starkweather, ITEA Executive Director, that ITEA should propose guidelines for reporting country-specific technology education. Dr. Starkweather encouraged this presenter to do so. This paper begins with this subject.

A Good Approach to Gathering Country-specific Technology Education Is An Area Study

In G. Z. F. Bereday's four-stage comparative methodology (see Table 1), an area study comprises the first two stages and a comparative study consists of all four stages. Foster (1988) identified two basic types of area studies as follows:

1. Historical Study--This type examines educational development in a particular nation/state and attempts to describe those factors believed to be significant in influencing its development.
2. Case Study--This type tends to concentrate upon one of the dimensions or functions of formal education in a particular nation/state, such as vocational-technical education and economic development.

Accordingly, a country-specific study on technology education is a case-study type of area study, which may use historical materials.

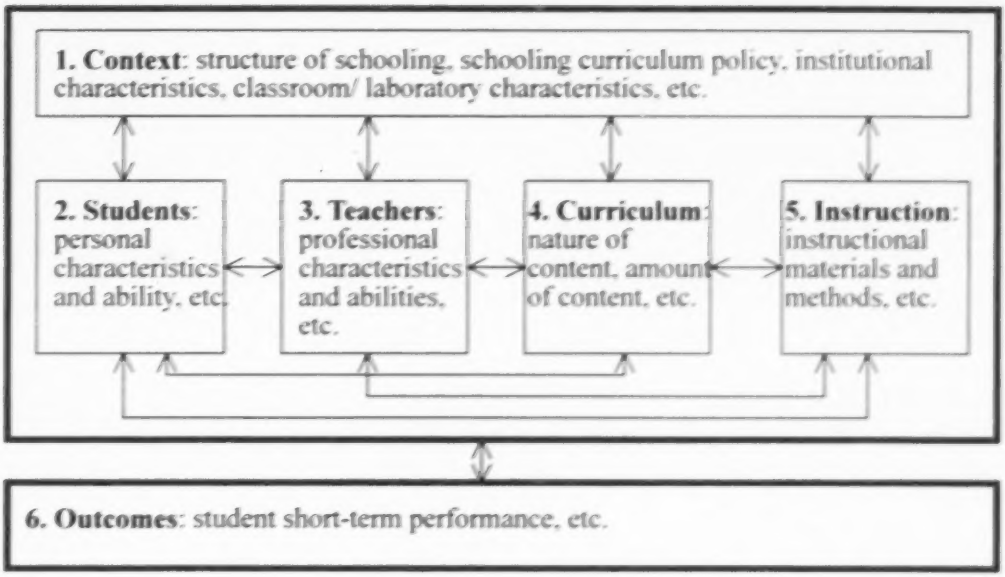
Table 1.

Bereday's Four-stage Comparative Methodology

Stage	Step	Study
1. Description	1.1 select a topic, issue or problem. 1.2 collect and collate educational data relevant to the topic in selected countries.	Area Study
2. Interpretation	2.1 interpret the data, applying such disciplines as are relevant in order to obtain an understanding of it in the social context.	Comparative Study
3. Juxtaposition	3.1 juxtapose the interpreted data in order to reveal possible bases for comparison. 3.2 develop hypotheses.	
4. Comparison	4.1 test hypotheses by means of comparative analysis of the interpreted data. 4.2 draw conclusions.	

Source: Bereday, 1966; cited in Trethewey, 1976.

Borrowing Cruickshank's ideas (1990), a model for the study of country-specific technology education is shown in Figure 1. It uses six variables: (1) contexts in which technology education takes place, (2) technology education students, (3) technology education teachers, (4) the contents of the technology education curriculum, (5) instruction in the technology education program, and (6) student outcomes.


1. Context: structure of schooling, schooling curriculum policy, institutional characteristics, classroom/ laboratory characteristics, etc.
2. Students: personal characteristics and ability, etc.
3. Teachers: professional characteristics and abilities, etc.
4. Curriculum: nature of content, amount of content, etc.
5. Instruction: instructional materials and methods, etc.
6. Outcomes: student short-term performance, etc.

↔ : interaction.

Figure 1. A model for the study of country-specific technology education.

There have been some studies on country-specific technology education. For example, Raat et al. (1993) reported on "Technology Education in General Education School-technology in Belgium, Denmark, France, Germany, United Kingdom and in the Netherlands." In their work, the following four aspects were emphasized: (1) the teaching of general technology, (2) whether technology education is integrated with other subjects or is a separate subject, (3) the practical elements of technology education, and (4) the effects of technology education policy on subject content and on general education policy. Apparently, the above aspects or descriptors can be included in the model shown in Figure 1.

In the field of vocational-technical education, Unesco's "Guidelines for Country Reports" (Unesco, 1984a), along with the "Unesco Revised Recommendation concerning Technical and Vocational Education" (Unesco, 1984b), are useful in preparing the country reports and case studies. The following three parts are suggested in the guidelines: (1) a technical and vocational education profile, (2) the dynamics of the development process, and (3) international cooperation.

Technology education is a realm of general education and is mainly provided at both the primary and secondary education levels. Based on this notion, the model shown in Figure 1, and Unesco's guidelines for vocational-technical education, guidelines for reporting country-specific technology education are proposed in the following.

Proposed Guidelines for Country Reports

I. Technology education profile

1. **The structure of the education system**

Briefly describe and illustrate graphically the structure of the education system as a whole and the place of technology education, including teacher training, within it, indicating the articulation between stages of schooling.

2. **The curriculum of technology education**

Descriptors of technology education are described in the following:

2.1 Types of institutes at both the primary and secondary levels offering technology education programs, such as grammar schools, technical schools, etc.

2.2 Program status of technology education: Is it a required or elective course? Is it a separate subject or a part of an integrated subject? Is it considered a vocational course? etc.

2.3 Program titles of technology education, such as industrial arts, technology education, design and technology, etc.

2.4 Time allocation for technology education: How many teaching hours are allocated for technology education? etc.

2.5 Major objectives of technology education, such as technological awareness, technological literacy, technological capacity, etc.

2.6 Characteristics of the target group: age-groups and grade levels which have access to technology education programs.

2.7 Content organizers of technology education: What are practical elements of technology education?

2.8 General characteristics of technology education programs, such as the relative emphasis on theory and practice, on designing and making things, etc.; the differences, if any, between programs offered in urban and rural areas or to males and females.

2.9 Means of recognition of technology education achievement.

3. Instruction in technology education

Describe the teaching and learning processes with an emphasis on methods and materials. Indicate the general pedagogical principles underlying teaching and learning in technology education, and illustrate them by means of particular references to significant characteristics of the facilities, equipment and materials used; emphasis on project and/or problem modes; and evaluation of the teaching and learning process.

4. Technology education teachers

Give a succinct picture of the recruitment, training and qualifications required of

teachers in technology education programs described above.

II. Dynamics of the development process

1. Major problems

Analyze the major problems faced in developing technology education. On the macro level of national policy, major problems include: inequalities between males and females and between urban and rural education which impede the democratization of education as a whole; obstacles to overall reform of education which, in consequence, hinder the development of technology education, such as the selection and examination process, overemphasis on traditional academic areas in education, etc.; maladjustment between education and the world of work as reflected by a lack of correspondence between economic development needs and the education and training provided within the education system. On the micro level within technology education, major problems include: no provision for technology education in the general education curriculum; no provision of well-organized content in technology education curricula; ineffective teaching and learning methods and materials; difficulties in recruiting and training qualified teachers; no documentation or information services for technology education.

2. Innovation and experimentation

Briefly describe the process of innovation and experimentation undertaken in order to obtain solutions to the major problems identified.

2.1 The process for deciding on priority areas and for initiating innovation and experimentation.

2.2 The role of research and development in identifying the specific problems to be dealt with and in formulating projects to be undertaken on an experimental basis.

2.3 The obstacles encountered in the course of conducting experiments and an explanation of how these obstacles are overcome.

2.4 How results are evaluated.

3. Policy and implementation

Describe the process of incorporating the successful results of experimentation into general policy, and indicate how this policy is (or will be) implemented.

III. International cooperation

1. Methods of cooperation and coordination

Indicate the ways in which this country participates in international cooperation for the purpose of developing technology education and how these activities are coordinated.

2. The means of information exchange

Describe the provisions existing in this country to facilitate a regular exchange with other countries of information, documentation and materials of international

interest obtained from

research and development efforts concerning technology education.

3. Trends in international participation

Predict the trends of participation of regional and international organizations in the development process of technology education.

As mentioned before, the country-specific data collected should be not only described, but also interpreted in light of its social context.

The Proposed Guidelines Should be Validated

The aim of the guidelines proposed in this paper is to provide a common framework to facilitate discussion and information exchange among technology educators in different countries. All technology educators are most welcome to make comments or express concerns about the guidelines and to prioritize the items included in the guidelines.

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